

In the latter area they were noted on 9 or 10 days, blowing from southwest, south, southeast, and northeast, of forces varying from 8 to 10. No forces higher than 10 were reported east of the 160th meridian of east longitude, but west of it full hurricane velocities were encountered by steamers on several days, the result of typhoons active in the waters of the Far East during the early half of the month. Our only knowledge of these storms at this writing is gathered from the few reports at hand of vessels traversing this region, since the summary of typhoons from the Philippine Weather Bureau has not been received. These reports indicate 3 and probably 4 violent storms.

On October 2 and 3 the American steamer *President Lincoln*, while some 600 miles east of Yokohama, ran into a typhoon and encountered hurricane winds from the southwest. The vessel must have crossed the storm near its center, since the observed pressure went as low as 28.45 inches. On the 6th and 7th an equally severe storm was experienced about 300 miles east-northeast of Luzon by the American steamer *Meton*, eastward bound from the Philippines. The lowest pressure observed was 28.93 inches, near 18° N., 131½° E. On the 11th and 12th the Dollar Line steamship *President Monroe*, toward Kobe, ran into a typhoon near 31° N., 152½° E. The hurricane winds were from the northeast, lowest pressure

29.13 inches. On the 13th the British steamer *Harold Dollar*, bound for San Francisco, fell in with rough weather while among the Kuril Islands. The westerly gales increased to hurricane force on the 14th and 15th, and the lowest pressure, 29.10 inches, occurred on the 14th, while the vessel was in 44° 39' N., 151° E.

One tropical cyclone, probably of no great strength, occurred in the waters off the coast of Mexico, first appearing south of Acapulco on the 2d. By the 3d it had developed sufficient energy to cause winds of gale force, as shown by the report of the American steamer *William Penn*, which encountered a south wind of force 8, pressure 29.55, in 14° 05' N., 104° 21' W. It is not known if gales attended the subsequent movements of the cyclone, but according to the Mexican weather reports it lay off the coast, apparently between Acapulco and the western part of the Gulf of Tehuantepec until the 11th, when it disappeared.

Moderate northers blew in the Gulf of Tehuantepec on the 26th and 27th.

At Honolulu the prevailing wind was from the north-east, but there were a greater number of winds than usual from other directions. Velocities exceeding 24 miles occurred on 5 days, the maximum being 31 from the east on the 17th. The total precipitation was 1.93 inches, which is 0.38 inch more than the normal.

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DETAILS OF THE WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The month as a whole did not depart widely from a normal October. The heavy rains of the previous month in middle Mississippi Valley States continued throughout the first week of October over a broad band stretching from the Texas Panhandle, Oklahoma, and Arkansas northeastward to the Great Lakes.

The month was warm with the exception of northeastern States where atmospheric pressure was higher than the normal and considerably above that for the previous months. The usual details follow.—A. J. H.

CYCLONES AND ANTICYCLONES

By W. P. DAY

The tracks of 20 low-pressure areas were plotted during October, an increase of 3 over the preceding month; and storm movement across the United States was comparatively rapid. However, over the northeastern Pacific Ocean there were several major depressions, which were unusually slow in movement. Two tropical disturbances developed during the month, one of which, passing over west-central Cuba and Bermuda, developed great intensity and apparently retained its identity far out into the Atlantic.

The HIGHS were mostly of the Pacific type. Although high-pressure prevailed over the Mackenzie Valley from the 8th until the 16th and again toward the end of the month, the HIGHS from this region were weak, since they were usually coincident with rising pressure moving in from the Pacific, with which they coalesced.

FREE-AIR SUMMARY

By L. T. SAMUELS

Free-air temperatures were in general below their normal values at the northern stations and above at the southern stations. (See Table 1.) The departures at the latter decreased with increase in altitude while those at the northern stations increased in general with altitude.

Relative humidity and vapor pressure departures were mostly positive, those for the former being small while those for the latter were moderate.

It will be seen in Table 2 that the resultant winds at Due West were practically diametrically opposite to their normals, a marked southerly component occurring instead of the usual one from the north. At this station the greatest excess in the mean monthly temperatures was found.

A kite flight of more than ordinary interest was obtained at Broken Arrow on the 4th just as a wind shift line passed over the station. The following tabulation shows the temperatures and upper and lower wind directions recorded during the ascent and descent of this flight. It will be seen that the surface wind shifted from southerly to northerly during the ascent while the wind aloft remained southerly. Further, this lower northerly current became successively deeper during the flight. The surface temperature dropped immediately with the arrival of the northerly current but the dissipation of the cloud layer which accompanied the shift soon caused the temperature to rise again in its ordinary diurnal march. The steadily increasing effect of this surface warming is well brought out in the table by the relatively higher temperatures from the ground to 1,000 m. during the descent of the flight than during the ascent. It will be noted, however, that the temperatures at 2,000 m. and 2,500 m. were lower during the descent than during the ascent notwithstanding the continuance of the southerly winds at these levels. This cooling within the southerly current was evidently the result of its forced ascent by the underrunning northerly current. This explanation is further strengthened by the fact that at 3,000 m. an appreciable warming instead of cooling occurred, apparently because the air at this higher level had not yet been forced upward. While the air in its forced ascent cooled to some extent by reason of its expansion yet the absolute humidity was too low to cause condensation.